



Test Report

Report No	EF0916-1
Client	Enterasys Networks, Inc. 50 Minuteman Road Andover, MA 01810
Phone	978-684-1009
FRN	0006916761
	Class II Permissive Change
Model FCC ID	RBT-4102 QXO-RBT4102
Equipment Type Equipment Code	Digitally Modulated; Unlicensed National Information Infrastructure DTS and NII
Results	As detailed within this report
Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	4/12/06
Conditions of issue	This Test Report is issued subject to the conditions stated in 'terms and conditions' section of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.

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Summary

This test report supports a Class II Permissive Change of a transmitter operating pursuant to 47 CFR 15.247 and 15.407. The product is the Enterasys Networks Multi-Channel Access Point (model #: RBT-4102). It is a transmitter that operates in the ranges 2400-2483.5MHz, 5.15-5.35GHz, and 5.725-5.850GHz. The change is the addition of five external antenna options. The antenna models are listed below:

RBTES-BG-M08M	2.4GHz	8dBi
RBTES-BG-P18M	2.4GHz	18dBi
RBTES-BG-S1490M	2.4GHz	14dBi
RBTES-AM-M10M	5.15-5.35GHz	10dBi
RBTES-AW-S1590M	4.9-6.0GHz	16dBi

Radiated emissions testing was performed over the frequency range of each antenna. It was found that Channels 1, 2, 3, and 11 must be dropped in order for the EUT to accommodate all of these antennas and still pass band edge requirements.

Test Methodology

Radiated emissions testing is performed according to the procedures specified in ANSI C63.4 (2003). Emissions were maximized by rotating the device around three orthogonal axes as well as varying the test antenna's height and polarity.

Frequency range investigated: 1GHz – 8GHz

Measurement distance: 3m

EUT Configuration

EUT Configuration				
Work Order: F0916				
Company: Enterasys Networks, Inc.				
Company Address: 50 Minuteman Road Andover, MA 01810				
Contact: Jon Ballew				
Person Present: None				
MN		SN		
EUT: RBT-4102		1		
EUT Description: Wireless Access Point				
EUT Max Frequency: 5.825GHz				
Support Equipment:	MN	SN		
IBM Thinkpad	Type 2373	99-RCM82		
IBM Thinkpad	Type 2373	99-GRVGD		
Enterasys Matrix Hub	E1	--		
EUT Cables:	Qty	Shielded?	Length	Ferrites
Ethernet	1	No	10m	None
Antenna	1	Yes	5m	None
Power	1	No	2m	1 Molded
Unpopulated EUT Ports:	Qty	Reason		
DB9 Serial	1	Setup/Diag		
Software / Operating Mode Description:				
EUT was communicating at full power with a wireless card in one of the IBM Thinkpads using the Brix software. Also utilized some diagnostic software to control both channel and power level.				

Radiated Emissions Measurements

Each antenna was tested in and around its passband for spurious emissions as indicated in the tables below. High and low bandedges were also measured. With the exception of the first table below (RBTES-BG-M08M antenna), no spurious emissions within 10dB of the limit were found.

Radiated Emissions Table							Curtis-Straus LLC		
Date: 24-Feb-06 27-Feb-06			Company: Enterasys				Work Order: F0916		
Engineer: Evan Gould			EUT Desc: RBT-4102						
Frequency Range: 1-5GHz				Measurement Distance: 3 m					
Notes: RBTES-BG-M08M 2.4GHz 8dBi omnidirectional TX and RX modes are active									
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
Hav	1056.1	29.3	17.7	25.5	2.1	39.2	54.0	-14.8	Pass
HIGH BAND EDGE									
Ch.10; Power setting = 16; 54Mbps									
Vpk	2483.5	47.7	20.0	30.3	3.2	61.2	74.0	-12.8	Pass
Vav	2483.5	22.6	20.0	30.3	3.2	36.1	54.0	-17.9	Pass
Ch.10; Power setting = 16; 6Mbps									
Vpk	2483.5	52.7	20.0	30.3	3.2	66.2	74.0	-7.8	Pass
Vav	2483.5	28.7	20.0	30.3	3.2	42.2	54.0	-11.8	Pass
LOW BAND EDGE									
Ch.2; Power setting = 18; 6Mbps									
Vpk	2390.0	57.5	20.1	30.1	3.1	70.6	74.0	-3.4	Pass
Vav	2390.0	30.1	20.1	30.1	3.1	43.2	54.0	-10.8	Pass
Table Result:		Pass	by	-3.4 dB			Worst Freq:		2390.0 MHz
Test Site: "A"		Pre-Amp: Yel-Blk		Cable: EMIR-HIGH 7		Analyzer: Orange		Antenna: Black Horn	

Radiated Emissions Table							Curtis-Straus LLC		
Date: 24-Feb-06			Company: Enterasys			Work Order: F0916			
Engineer: Evan Gould			EUT Desc: RBT-4102						
Frequency Range: 1-5GHz				Measurement Distance: 3 m					
Notes: RBTES-BG-S1490M 2.4GHz 14dBi TX and RX modes are active									
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
HIGH BAND EDGE									
Ch.10; Power setting = 16; 6Mbps									
Vpk	2483.5	59.3	20.0	30.3	3.2	72.8	74.0	-1.2	Pass
Vav	2483.5	34.1	20.0	30.3	3.2	47.6	54.0	-6.4	Pass
LOW BAND EDGE									
Ch.4; Power setting = 19; 6Mbps									
Vpk	2390.0	55.8	20.1	30.1	3.1	68.9	74.0	-5.1	Pass
Vav	2390.0	32.3	20.1	30.1	3.1	45.4	54.0	-8.6	Pass
Table Result:		PASS	by		-1.2 dB		Worst Freq:		2483.5 MHz
Test Site: "A"		Pre-Amp: Yel-Blk		Cable: EMIR-HIGH		Analyzer: Orange		Antenna: Black Horn	

Radiated Emissions Table							Curtis-Straus LLC		
Date: 27-Feb-06			Company: Enterasys			Work Order: F0916			
Engineer: Evan Gould			EUT Desc: RBT-4102						
Frequency Range: 1-5GHz					Measurement Distance: 3 m				
Notes: RBTES-BG-P18M 2.4GHz 18dBi antenna TX and RX modes are active									
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
LOW BAND EDGE									
Ch.4; Power setting = 19; 6Mbps									
Vpk	2390.0	58.4	20.1	30.1	3.1	71.5	74.0	-2.5	Pass
Vav	2390.0	32.7	20.1	30.1	3.1	45.8	54.0	-8.2	Pass
HIGH BAND EDGE									
Ch.10; Power setting = 16; 6Mbps									
Vpk	2483.5	57.6	20.0	30.3	3.2	71.1	74.0	-2.9	Pass
Vav	2483.5	33.4	20.0	30.3	3.2	46.9	54.0	-7.1	Pass
Table Result:		Pass	by	-2.5 dB		Worst Freq:		2390.0 MHz	
Test Site: "A"		Pre-Amp: Yel-Blk		Cable: EMIR-HIGH 7		Analyzer: Orange		Antenna: Black Horn	

Radiated Emissions Table							Curtis-Straus LLC		
Date: 27-Feb-06			Company: Enterasys			Work Order: F0916			
Engineer: Evan Gould			EUT Desc: RBT-4102						
Frequency Range: 3-7GHz					Measurement Distance: 3 m				
Notes: RBTES-AM-M10M 5.15-5.35GHz 10dBi omnidirectional TX and RX modes are active									
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
LOW BAND EDGE									
Ch.36; Power setting = 13; 6Mbps									
Vpk	5150.0	39.3	19.7	36.2	4.4	60.2	74.0	-13.8	Pass
Vav	5150.0	19.5	19.7	36.2	4.4	40.4	54.0	-13.6	Pass
HIGH BAND EDGE									
Ch.64; Power setting = 17; 6Mbps									
Vpk	5350.0	36.7	19.9	36.6	4.4	57.8	74.0	-16.2	Pass
Vav	5350.0	19.8	19.9	36.6	4.4	40.9	54.0	-13.1	Pass
Table Result:		Pass	by	-13.1 dB			Worst Freq:		5350.0 MHz
Test Site: "A"		Pre-Amp: Yel-Blk		Cable: EMIR-HIGH 7		Analyzer: Orange		Antenna: Black Horn	

Radiated Emissions Table							Curtis-Straus LLC		
Date: 27-Feb-06			Company: Enterasys			Work Order: F0916			
Engineer: Evan Gould			EUT Desc: RBT-4102						
Frequency Range: 2-8GHz					Measurement Distance: 3 m				
Notes: RBTES-AW-S1590M 4.9-6.0GHz 16dBi sector TX and RX modes are active									
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
LOW BAND EDGE									
Channel 36; power = 13; 6Mbps									
Vpk	5150.0	46.7	19.7	36.2	4.4	67.6	74.0	-6.4	Pass
Vav	5150.0	25.0	19.7	36.2	4.4	45.9	54.0	-8.1	Pass
HIGH BAND EDGE									
Channel 64; power = 17; 6Mbps									
Vpk	5350.0	44.2	19.9	36.6	4.4	65.3	74.0	-8.7	Pass
Vav	5350.0	24.0	19.9	36.6	4.4	45.1	54.0	-8.9	Pass
Table Result:		Pass	by	-6.4 dB		Worst Freq:		5150.0 MHz	
Test Site: "A"		Pre-Amp: Yel-Blk		Cable: EMIR-HIGH 7		Analyzer: Orange		Antenna: Black Horn	

Power Reductions

Due to the addition of antennas with high directional gains, and the fact that the FCC's power limit decreases by 1db for every 1dB in gain above 6dBi, the power settings must be reduced according to the following table. Reference the attached ADT reports which accompanied the original application for certification.

Antenna Being Added	Gain (dBi)	Frequency Range (GHz)	Original Margin (dB)	Necessary Reduction (dB)	Power Setting Reduction	Resultant Power Reduction (dB)
RBTES-BG-M08M	8	2.4-2.483	5	0	N/A	N/A
RBTES-BG-S1490M	14	2.4-2.483	5	>3	18 to 15	-4.5
RBTES-BG-P18M*	18	2.4-2.483	5	0	N/A	N/A
RBTES-AW-S1590M	16	5.15-5.25	0.38	>9.6	17 to 6	-11.8
		5.25-5.35	0.93			
		5.725-5.825	6.37	>3.6	20 to 14	-5.2
RBTES-AM-M10M	10	5.15-5.25	0.38	>3.6	17 to 12	-5.6
		5.25-5.35	0.93			

*Note: The RBTES-BG-P18M is a Point-to-Point antenna. According to 47 CFR 15.247(c)(1)(i), the 30dBm limit must be reduced by 1dB for every 3dB of directional gain above 6dBi. Therefore, the limit becomes 26dBm, and the margin becomes 1dB: no reduction is necessary.

Test Equipment Used

REV. 12-JAN-2006

SPECTRUM ANALYZERS / RECEIVERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	HP	3441A03559	00024	I	30-DEC-2006
WHITE	9kHz-22GHz	8593E	HP	3547U01252	00022	I	08-MAR-2006
BLUE	9kHz-1.8GHz	8591E	HP	3223A00227	00070	I	14-DEC-2006
YELLOW	9kHz-2.9GHz	8594E	HP	3523A01958	00100	I	20-APR-2006
GREEN	9kHz-26.5GHz	8593E	HP	3829A03618	00143	I	21-NOV-2006
BLACK	9kHz-12.8GHz	8596E	HP	3710A00944	00337	I	02-NOV-2006
YELLOW-BLACK	20Hz-40.0MHz	3585A	HP	2504A05219	00030	I	Out of Service
TELECOM 3585A	20Hz-40.0MHz	3585A	HP	1750A02762	01067	I	04-FEB-2006
ORANGE	9kHz-26.5GHz	E4407B	HP	US394440975	00394	I	01-DEC-2006
RENTAL E4407B	9kHz-26.5GHz	E4407B	HP	SG44210511	Rental	1	05-JAN-2007
EMI TEST RECEIVER	20-1000MHz	ESVS30	R&S	827957/001	01098	I	27-OCT-2006

OPEN AREA TEST SITE (OATS)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
SITE F	93448	IC 2762-F	R-1688	II	04-APR-2007
SITE T	93448	IC 2762-T	R-905	II	14-AUG-2007
SITE A	93448	IC 2762-A	R-903	II	13-AUG-2007
SITE M	93448	IC 2762-M	R-904	II	19-MAR-2007

PREAMPS / ATTENUATORS / FILTERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.10-2000MHz	ZFL-1000-LN	C-S	N/A	00798	II	08-APR-2006
BLUE	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00759	II	03-AUG-2006
BLUE-BLACK	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00800	II	04-JAN-2007
GREEN	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00802	II	21-JUL-2006
BLACK	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00799	II	25-AUG-2006
ORANGE	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00765	II	28-DEC-2006
WHITE	1-20GHz	SMC-12A	C-S	426643	00760	II	04-AUG-2006
BROWN	1-20GHz	PM2-38-218-4R5-17-15-SFF	C-S	PL1655	1132	II	02-DEC-2006
YELLOW-BLACK	1-20GHz	SMC-12A	C-S	535055	00801	II	25-AUG-2006
HF (YELLOW)	18-26.5GHz	AFS4-18002650-60-8P-4	C-S	467559	00758	II	23-AUG-2007
HIGH PASS FILTER	1-18 GHz	SPA-F-55204	K&L	36	00817	II	05-JAN-2008
LOW PASS FILTER	1-9 GHz	11SL10-4100/X4400-O/O	K&L	4	00816	II	05-JAN-2008
HF 20dB 50W ATTENUATOR	0.03-20 GHz	PE 7019-20	PASTERNAK	01	00791	II	10-MAY-2007
HF 30dB 50W ATTENUATOR	0.03-20 GHz	PE 7019-30	PASTERNAK	02	1168	II	10-MAY-2007
LOW FREQ LPF	10-100kHz	L200K1G1	MICROWAVE CIRCUITS	4460-01 DC0432	1019	II	OUT OF SERVICE
LOW FREQ LPF	10-100kHz	L200K1G1	MICROWAVE CIRCUITS	4777-01 DC0434	1088	II	OUT OF SERVICE

ANTENNAS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
YELLOW HORN	1-18GHz	3115	EMCO	9608-4898	00037	I	27-MAY-2007(EMI) / 05-JUN-2006 (RFI)
BLACK HORN	1-18GHz	3115	EMCO	9703-5148	00056	I	17-JUN-2007
ORANGE HORN	1-18GHz	3115	EMCO	0004-6123	00390	I	09-JUN-2007
HF (WHITE) HORN	18-26.5GHz	801-WLM	WAVELINE	00758	00758	I	26-AUG-2007
SMALL LOOP	9kHz-30MHz	PLA-130/A	ARA	1024	00755	I	23-FEB-2006
LARGE LOOP	20Hz-5MHz	6511	EMCO	9704-1154	00067	I	12-JAN-2006
ACTIVE MONOPOLE	30Hz-30MHz	3301B	EMCO	3824	00068	II	04-MAY-2006
INDUCTION COIL	50-60Hz	1000-4-8	C-S	N/A	00778	II	26-SEP-2007
ADJUSTABLE DIPOLE	30-1000MHz	3121C	EMCO	1370	00757	II	18-MAR-2007
ADJUSTABLE DIPOLE	30-1000MHz	3121C	EMCO	1371	00756	II	18-MAR-2007
RE101 LOOP SENSOR	30Hz-100kHz	RE101-13.3cm	C-S	N/A	00818	II	13-MAR-2007
RS101 RADIATING LOOP	30Hz-100kHz	RS101-12cm	C-S	N/A	00819	II	13-MAR-2007
RS101 LOOP SENSOR	30Hz-100kHz	RS101-4cm	C-S	N/A	00820	II	13-MAR-2007

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Terms And Conditions

Paragraph 1. SERVICES. LABORATORY will:

- 1.1 Use the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.
- 1.2 Perform all technical services in substantial accordance with the generally accepted laboratory principles and practices.
- 1.3 Retain all pertinent records relating to the services performed for a period of three (3) years following submission of the report describing such services, during which period the records will be made available to CLIENT upon reasonable request.

Paragraph 2. CLIENT'S RESPONSIBILITIES. CLIENT or his authorized representative will:

- 2.1 Provide LABORATORY with all plans, schematics, specifications, addenda, change orders, drawings and other information for the proper performance of technical services.
- 2.2 Designate a person to act as CLIENT's representative with respect to LABORATORY's services to be performed on behalf of the CLIENT; such person or firm to have complete authority to transmit instructions, receive information and data, interpret and define CLIENT's policies and decisions with respect to the LABORATORY's work on behalf of the CLIENT and to order, at CLIENT's expense, such technical services as may be required.
- 2.3 Designate a person who is authorized to receive copies of LABORATORY's reports.
- 2.4 Undertake the following:
 - (a) Secure and deliver to LABORATORY, without cost to LABORATORY, preliminary representative samples of the equipment proposed to require technical services, together with any relevant data.
 - (b) Furnish such labor and equipment needed by LABORATORY to handle samples at the LABORATORY and to facilitate the specified technical services.

Paragraph 3. GENERAL CONDITIONS:

- 3.1 LABORATORY, by the performance of services covered hereunder, does not in any way assume any of those duties or responsibilities customarily vested in the CLIENT, its employees, or any other party, agency or authority.
- 3.2 LABORATORY shall not be responsible for acts of omissions of any other party or parties involved in the design, manufacture or maintenance of the equipment or the failure of any employee, contractor or subcontractor to undertake any aspect of equipment's design, manufacture or maintenance.
- 3.3 LABORATORY is not authorized to revoke, alter, release, enlarge or release any requirement of the equipment's design, manufacture or maintenance unless specifically authorized by CLIENT or his authorized representative.
- 3.4 THE ONLY WARRANTY MADE BY LABORATORY IN CONNECTION WITH ITS SERVICE PERFORMED HEREUNDER IS THAT IT WILL USE THAT DEGREE OF CARE AND SKILL AS SET FORTH IN PARAGRAPH 1 ABOVE. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED FOR SERVICES PROVIDED HEREUNDER.
- 3.5 Where the LABORATORY indicates that additional testing is advisable to obtain more valid or useful data, and where such testing has not been authorized, CLIENT agrees to view such test reports as inconclusive and preliminary.
- 3.6 The LABORATORY will supply technical service and prepare a report based solely on the sample submitted to the LABORATORY by the CLIENT. The CLIENT understands that application of the data to other devices is highly speculative and should be applied with extreme caution.
- 3.7 The LABORATORY agrees to exercise ordinary care in receiving, preserving and shipping (F.O.B. Littleton, MA) any sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise from loss, damage or destruction of the samples due to the act of examination, modification or testing, or technical services or circumstances beyond LABORATORY's control.
- 3.8 The LABORATORY will hold samples for thirty (30) days after tests are completed, or until the CLIENT's outstanding debts to the LABORATORY are satisfied, whichever is later.
- 3.9 The CLIENT recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.
- 3.10 It is agreed between LABORATORY and CLIENT that no distribution of any tests, reports or analysis other than that described below shall be made to any third party without the prior written consent of both parties unless such distribution is mandated by operation of law. It is agreed that tests, reports, or analysis results may be disclosed to third party auditors of the laboratory at the laboratory facility in the course of accreditation maintenance audits. No reference to reports or technical services of the LABORATORY shall be made in any advertising or promotional literature without the express written permission of the LABORATORY.
- 3.11 The CLIENT acknowledges that all employees of LABORATORY operate under employment contracts with the LABORATORY and CLIENT agrees not to solicit employment of such employees or to solicit information related to other clients from said employees.
- 3.12 In recognition of the relative risks and benefits of the project to both CLIENT and LABORATORY, the risks have been allocated such that the CLIENT agrees, to the fullest extent permitted by law, to limit the liability of the LABORATORY to the CLIENT for any and all claims, losses, costs, damages of any nature whatsoever or claims expenses from any cause or causes, including attorneys' fees and costs and expert witness fees and costs, so that the total aggregate liability of the LABORATORY to the CLIENT shall not exceed \$100,000, or the LABORATORY'S total fee for services rendered on this project, whichever is greater. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

Paragraph 4. INSURANCE:

- 4.1 LABORATORY shall secure and maintain throughout the full period of the services provided to the CLIENT adequate insurance to protect it from claims under applicable Workmen's Compensation Acts and also shall maintain one million dollars of general liability coverage to cover claims for bodily injury, death or property damage as may arise from the performance of its services.
- 4.2 The CLIENT hereby warrants that it has sufficient insurance to protect its employees adequately under applicable Workmen's Compensation Acts and for bodily injury, death, or property damage.
- 4.3 No insurance of whatever kind or type, which may be carried by either party is to be considered as in any way limiting any other party's responsibility for damages resulting from their operations or for furnishing work and materials.

Paragraph 5. PAYMENT:

- 5.1 CLIENT shall pay to LABORATORY such fees for services as previously agreed, orally or in writing, within 30 days of presentment of a bill for such services performed. In the event CLIENT ordered, orally or in writing, services but such services were not assigned a rate for billing, such services shall be billed at the LABORATORY's reasonable and customary rate.

- 5.2 CLIENT shall be responsible for all shipping, customs and other expenses related to services provided by LABORATORY to the CLIENT, and shall fully insure any test sample or other equipment provided to LABORATORY by the CLIENT.
- 5.3 Amounts overdue from CLIENT to LABORATORY shall be charged interest at a rate of 1½% per month.

Paragraph 6. ISO/IEC GUIDE 17025 ADDITIONS:

- 6.1 CLIENT agrees that this test report will not be reproduced except in full, without written approval from the LABORATORY.
- 6.2 CLIENT agrees that this test report shall not be used to claim product endorsement by A2LA or ANSI or any agency of the U.S. Government.
- 6.3 CLIENT agrees that test results presented herein relate only to the sample tested by the LABORATORY.

A2LA Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

CURTIS-STRAUS¹
527 Great Road
Littleton, MA 01460
Barry Quinlan Phone: 978-486-8880
ELECTRICAL

Valid until: July 31, 2007

Certificate Number: 1627.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC), Telecommunications, and Product Safety tests:

Electromagnetic Compatibility (EMC)

Radiated emissions testing (electric and magnetic fields)*; Conducted emissions testing (voltage and current)*; Electrostatic Discharge testing*; Electrical Fast Transient testing*; Radiated Immunity testing*; Conducted Immunity testing*; Lightning Immunity testing*; Voltage Dips*, Interrupts and Voltage Variations testing*; Magnetic Immunity testing*; RF Power measurements*; Frequency Stability Measurements*; Longitudinal Induction measurements*; Harmonic emissions testing*; Light flicker testing*; Low frequency disturbance voltage testing*; Disturbance Power measurements*; Power Cross Overvoltage testing*;

Test Type	Test Method(s)
Emissions	
Radiated and Conducted Emissions	FCC 47 CFR Parts 15 & 18; C63.4; CISPR 22; EN55022; SABS CISPR 22; AS/NZS CISPR 22; AS/NZS 3548; Canada ICES-003; CNS13438; KN22; CISPR 11; EN 55011; SABS CISPR 11; AS/NZS CISPR 11; AS/NZS 2064; Canada ICES-001; CNS13803; KN11; CISPR 13; EN 55013; SABS CISPR 13; AS/NZS CISPR 13; AS/NZS 1053; KN13; CISPR 14-1; EN 55014-1; SABS CISPR 14; AS/NZS CISPR 14; AS/NZS 1044; CNS 13439; KN14; CISPR 15; EN 55015; KN15; GR-1089-CORE; CSA C108.8-M1983;
Harmonics	EN 61000-3-2; AS/NZS 61000.3.2
Flicker	EN 61000-3-3; AS/NZS 61000.3.3

1 Note: This accreditation covers testing performed at the laboratory listed above and the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 and, for test types marked with an asterisk, at other sites as defined in "A2LA specific criteria for the accreditation of site testing and site calibration laboratories."

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FCC Standards and Test methods Support TCB Status--	
FCC Scope A -- Unlicensed Radio Frequency Devices	
A1	1. 47 CFR Parts 11, 15 and 18 2. FCC MP-5, 3. ANSI C63.4-2003,
A2	1. 47 CFR Part 15, 2. ANSI C63.4-2003,
A3	1. 47 CFR Part 15, 2. ANSI C63.17-1998, 3. ANSI C63.4-2003,
A4	1. 47 CFR Part 15, 2. ANSI C63.4-2003,
FCC Scope B -- Licensed Radio Service Equipment	
B1	1. 47 CFR Parts 2, 22, 24, 25, and 27 2. ANSI/TIA-603-C (2004)
B2	1. 47 CFR Parts 2, 22, 74, 90, 95, and 97 2. ANSI/TIA-603-C (2004)
B3	1. 47 CFR Parts 2, 80, and 87 2. ANSI/TIA-603-C (2004)
B4	1. 47 CFR Parts 2, 21, 74, and 101 2. ANSI/TIA-603-C (2004)

Country Specific Standards and Other	
ITU EMC Standards	K.20; K.21; K.41; K.44
Swedish EMC Standards	BAKOM 3336.3
South African EMC Standards other than CISPR equivalents	SABS 1718-1; SANS 211/SABS CISPR 11; SANS 224/SABS CISPR 24; SANS 213/SABS CISPR 13; SANS 2200; SANS214-1/SABS CISPR 14-1; SANS214-2/SABS CISPR 14-2; SANS 215/SABS CISPR 15; SANS 222/SABS CISPR 22
Hong Kong EMC Standards	HKTA 1006; HKTA 1007; HKTA 1008; HKTA 1010; HKTA 1015; HKTA 1026; HKTA 1035; HKTA 1039; HKTA 1041; HKTA 1042; HKTA 1045
Singapore EMC Standards	IDA TS SRD; IDA TS EMC
Japanese VCCI Standards	VCCI V-3, VCCI V-4

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Immunity	
Electrostatic Discharge (ESD)	EN 61000-4-2; AS/NZS 61000.4.2; KN61000-4-2
Radiated Immunity (RFI)	EN 61000-4-3; AS/NZS 61000.4.3; KN61000-4-3
Electrical Fast Transient Bursts (EFT)	EN 61000-4-4; AS/NZS 61000.4.4; KN61000-4-4
Surge	EN 61000-4-5; AS/NZS 61000.4.5; KN61000-4-5
Conducted Immunity	EN 61000-4-6; AS/NZS 61000.4.6; KN61000-4-6
Magnetic Immunity	EN 61000-4-8; AS/NZS 61000.4.8; KN61000-4-7
Voltage Dips and Interrupts	EN 61000-4-11; KN61000-4-11
Low Frequency Conducted Disturbances	EN 61000-2-2

Family Product or Industry Specific Specifications including emissions and/or immunity	GR-1089-CORE; GR-78-CORE (ESD) EN50081-1; EN50081-2; EN50082-2; EN50082-1; EN 61000-6-1; EN 61000-6-2; EN 61000-6-3; EN 61000-6-4; EN 50091-2; EN 55024; CISPR 24 EN 55103-1; EN 55103-2; EN 61326; EN 61547; EN 50130-4; EN 50083-2; EN 60601-1-2; EN 60601-2-2; EN 60601-2-24; EN 60601-2-32; EN 60601-2-38; EN 60601-2-47; IEC 1800-3; EN 61800-3; EN 55020; CISPR 20; EN 60555 Part 2; EN 60555 Part 3; ETS 300 386-1; EN 300 386-2; EN 300 386, ETS 300 132-1; ETS 300 132-2; EN 60669-2-1; AS/NZS 3200.1.2; CNS 13783-1; ETR 283; C62.41
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Radiocommunications	
EU R&TTE Radio Standards;	EN 300 220-1; EN 300 220-3; EN 300 330-1; EN 300 330-2; EN 300 440-1; EN 300 440-2; EN 300 328; EN 300 385; EN 301 893
EU R&TTE EMC Standards	EN 300 339; EN 301 489-01; EN 301 489-03; EN 301 489-17
Canada Radio Standards	RSS-102; RSS-117; RSS-118; RSS-119; RSS-123; RSS-125; RSS-128; RSS-129; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-136; RSS-137; RSS-138; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-187; RSS-188; RSS-191; RSS-192; RSS-193; RSS-195; RSS-210; RSS-212; RSS-213; RSS-215; RSS-243; GL-36;
Australia/New Zealand Radio Standards	AS/NZS 4268; AS/NZS 4771; RFS29; Radiocommunications (Data Transmission Equipment Using Spread Spectrum Modulation Techniques); Radiocommunications (Spread Spectrum Devices); Radiocommunications (Short Range Devices); Radiocommunications (Low Interference Potential Devices);
Other Radio Standards	RTTE 01 (DGT-Taiwan);

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Telecommunications
Telecommunications Registration; General test methods; Lightning surge*; Drop testing*; Balance testing*; Signal power (metallic and longitudinal)*; Frequency measurements*; Pulse templates*; Leakage testing*; Impedance testing*; Hearing Aid Compatibility testing (excluding volume control)*; Protocol analysis* and Jitter testing*.

Telecom Standards	Title
North American standards FCC 47 CFR Part 68 Telephone Equipment CS-03 Issue 9	Connection of terminal equipment to the telephone Terminal network. Analog and Digital Equipment. TCB Scope C1. Specification for terminal equipment, terminal systems, Network protection devices, connection arrangements and hearing aids compatibility.
TIA/EIA TSB31-B 1998	Bulletin Part 68 Rationale and Measurement Guidelines (Feb 1998)
TIA-968-A, A1, A2, A3	Telecommunications Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment to the Telephone Network
T1.TRQ.6-2001	Technical Requirements for SHDSL, HDSL2, HDSL4 Digital Subscriber Line Terminal Equipment to Prevent Harm to the Telephone Network Industry
Australia standards AS/ACIF S002-2001	Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network
AS/ACIF S016-2001	Requirements for Customer Equipment for connection to hierarchical digital interfaces
AS/ACIF S031-2001	Requirements for ISDN Basic Access Interface
AS/ACIF S038-2001	Requirements for ISDN Primary Rate Access Interface
AS/ACIF S043-2001	Requirements for Customer Equipment for Connection to a Metallic Local Loop Interface of a Telecommunications Network — Part 1: General Part 2: Broadband Part 3: DC, Low Frequency AC and Voice band
International standards ITU-T G.703	Physical/electrical characteristics of hierarchical Digital interfaces
Hong Kong standards HKTA 2011	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to Direct Exchange Lines (DEL) of the Public Switched Telephone Network (PSTN) in Hong Kong
HKTA 2014	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong using ISDN Basic Rate Access (BRA) based on ITU-T Recommendations
HKTA 2028	Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 1544 kbit/s
HKTA 2029	Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 2048 kbit/s

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HKTA 2030 HKTA 2031 HKTA 2032 HKTA 2033 European standards TBR 1: 1995 TBR 2: 1997 TBR 3: 1995 + Amdt : 1997 TBR 4: 1995 + Amdt : 1997 TBR 012: 1993 + Amdt : 1996 TBR 013: 1996 TBR 21: 1998 TBR 24: 1997 (A2LA Cert. 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Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access Business Telecommunications (BT); Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased line (D2048U) Attachment requirements for terminal equipment Business Telecommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface Terminal Equipment (TE); Attachment requirements For pan-European approval for connection to the Analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signaling Business Telecommunications (BTC); 34 Mbit/s Digital Unstructured and structured leased lines (D34U and D34S); Attachment requirements for Terminal equipment interface Page 5 of 10	Taiwan standards (DGT) ADSL01 PSTN01 (non-voice only) New Zealand standards PTC 200 (non-voice only) PTC 217 TNA 117 PTC 270 Singapore Standards IDA TS ADSL IDA TS ADSL 2 IDA TS DLCN 1 IDA TS ISDN 1 IDA TS ISDN 2 IDA TS PSTN (non-voice only) South Africa standards TE-001 (non-voice only) Product Safety General test methods: Power input*, Permanence of marking*, Accessibility*, Permissibly limits*, Energy hazard measurement*, SELV circuits*, TNV limits*, Limited current*, Capacitor Discharge / voltage limitation*, Ring signal*, Humidity conditioning*, Creepage / Clearance / Distance thru Insulation (excluding CTI)*, Limited power measurement*, Ground Bond/Earthing*, Ground continuity*, Temperature*, Stability*, Applied force*, Steel sphere impact*, Mold stress*, Battery reverse current*, Ball pressure*, Leakage current*, Component abnormal*, Electric strength*, Impulse*, Overvoltage*, Acoustic sound pressure*, 130mm / 20mm flame*, Needle flame*, Hot flaming oil*, Locked rotor/motor armature*, Vibration, Bump, Drop*, Strain relief*, Torque*, Insulation resistance*, Sound level*, Handle loading*, Liquid overflow*, Spillage*, Liquid leakage*, Transformer shorts/overloads*, Rain test*, Wall mount*, Laser radiation (excluding x-ray)*, Voltage surge*, Functionality*, Protective impedance abnormal*, Capacitor short circuit abnormal*, Output abnormal*, Multi-supply abnormal*, Cooling abnormal*, Heating device abnormal*, Interlock abnormal*, Rigidity*, Cleaning* Asymmetric Digital Subscriber Line Terminal Equipment and POTS Splitter Technical Specifications ID0002 DSI Equipment Type Approval Guidelines IS6100 ISDN Terminal Equipment Technical Specifications Technical Specifications for Terminal Equipment for Connection to Public Switched Telephone Network Requirements for Connection of Customer Equipment to Analogue Lines Requirements for Bandwidth Management Devices Telecom 2048 kbit/s Standard Network Interface Interim arrangements for ADSL CPE Type Approval Specification for Asymmetric Digital Subscriber Line (Full-rate ADSL) Modems Type Approval Specification for Asymmetric Digital Subscriber Line Splitterless (G-Lite) Modems Type Approval Specification for Digital Interfaces based on hierarchical bit rates of 2048 kbit/s, 34 368 kbit/s and 139 264 kbit/s Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Basic Access Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Primary Rate Access (PRA) Type Approval Specification for connection of Terminal Equipment to Public Switched Telephone Network (PSTN) Standard for Telecommunication Line Terminal Equipment (TLTE) for Connection to the Public Switched Telephone Network (PSTN) Page 6 of 10
Product Safety Standards Specific Product Safety Standards UL 60950 2000 IEC 60950 1999 EN 60950 2000 IEC 60950-1 2001 UL 60950-1 2003 CSA C22.2 No. 60950-00 CSA C22.2 No. 60950-1 03 IEC 61010-1 1993 EN 61010-1 1993, 2001 IEC 61010-1 2001 UL 61010B-1 2003 CAN/CSA 1010-1 1999 (Including AM 2) IEC 60601-1 1995 EN 60601-1 1995 (Including AM 2) UL 2601-1 1997 IEC 60065 1998, 2000 ANSI/UL 6500: 1998 CAN/CSA 60065-00 AS/NZS 60065 2000 Canadian C22.2 No. 1-94 (1-98) 1994, 1998 EN 60065 1994 IEC 60825 1990 EN 60825-1 1994 IEC 60825-1 2001 IEC 60825-2 2000-5 IEC 60825-4 1997-11 21 CFR 1040.10 IEC 60335-1 1995 (Including AM2 – 1997 & AM 12 – 1997) EN 60335-1 2001 UL 60335-1 1998 CAN/CSA E335-1 1994 UL 61010A-1: 2002 EN 61010-1: 2001 (A2LA Cert. No. 1627.01) 3/15/06	Title Safety of information technology equipment Safety of information technology equipment Safety of information technology equipment, including Electrical business equipment. Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements. Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements. Electrical equipment for laboratory use Part 1: General requirements. Medical electrical equipment. Part 1: General requirements for safety. Medical electrical equipment Medical electrical equipment. Part 1: General Requirements for safety. Audio, video and similar electronic apparatus – Safety requirements Audio/video and musical instrument apparatus for Household, commercial and similar general use Australian/New Zealand Standard – Approval and test Specification – Mains operated electronic and related Equipment for household and similar general use Audio, video and similar electronic equipment. Consumer and commercial products Safety requirements for main operated electronic and related apparatus for household and similar general use. Radiation safety of laser products, equipment Classification, requirements and user's guide Safety of laser products Part 1: equipment Classification, requirements and user's guide. Safety of laser products – Part 2: Safety of optical communication systems Safety of laser products – Part 4: Laser guards Performance standard for laser products Safety of household and similar electrical appliances Part 1: General requirements Electrical equipment for laboratory use; part 1: General requirements Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements Page 7 of 10	AS/NZS 60950: 2000 EN 60950-1: 2001 AS/NZS 60950.1: 2003 UL 61010 -1: 2004 UL 60601-1: 2003 IEC 60601-1-1: 2000 EN 60601-1-1: 2001 UL 60065: 2003 CSA 60065: 2003 IEC 60065: 2001 EN 60065: 2002 EN 60204 -1: 1998 HKTA 2001 Safety information technology equipment Information Technology Equipment – Safety – Part 1: General Requirements Information Technology Equipment – Safety – General requirements Electrical Equipment for Measurement, Control and Laboratory Use; Part 1: General Requirements Medical Electrical Equipment, Part 1: General Requirements for Safety Medical Electrical Equipment - Part 1: General Requirements For Safety 1: Collateral Standard: Safety Requirements For Medical Electrical Systems Medical Electrical Equipment - Part 1: General Requirements for Safety – Section 1-1. Collateral Standard: Safety Requirements For Medical Electrical Systems Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Safety of Machinery – Electrical Equipment of Machines – Part 1: Specification for General Requirements Compliance Test Specification – Safety and Electrical Protection Requirements for Subscriber Equipment Connected to the Public Telecommunications Networks in Hong Kong Page 8 of 10

<i>Environmental Simulation</i>			Note 1. For standards or methods listed on the scope of accreditation without a revision date, laboratories are expected to be competent in the use of the current version within one year of the date of publication of the standard test method or upon the date specified by the standard test method originator when the originator has implementation authority. When a superseded standard or method is required for an accredited test, the scope will include the superseded date/version. For those that support the TCB/CB status of the organization acting as a certifier on behalf of the FCC or IC the expectation is currency within 30 days of Federal Register publication of changes for FCC and 30 days after IC website update. This note shall not be construed as an Accreditation Body implication to adopt a more current standard than is required in a regulation or code (i.e. the legal requirement) which is adopted by the lab under their responsibility. * On-site test service is available for this technology, test, or method.
<u>Test Technology</u>	<u>Test Standard</u>	<u>Supporting Standards</u>	
Accessibility*	IEC 60529	IP-0x thru IP-6x	
Acoustic Noise*	GR-63-CORE Sec 4.6		
Airborne Contaminants	GR-63-CORE Sec 4.5	MFG & Hygroscopic Dust	
Altitude	GR-63-CORE Sec 4.1.3		
Cold Start*	ETS 300 019	IEC 60068-2-1	
Drip	IEC 60529	IP-x1 & IP-x2	
Drops*	ETS 300 019	IEC 60068-2-32	
	GR-63-CORE Sec 4.3		
Dust	IEC 60529	IP-5x & IP-6x	
Firearms Resistance Testing	GR-487		
Fire Resistance	ANSI.T1.319		
	GR-63-CORE Sec 4.2	Fire & Needle Flame	
Heat Dissipation*	GR-63-CORE Sec 4.1.4		
Illumination	GR-63-CORE Sec 4.7		
Operational Temperature & Humidity (OpTH)*	ETS 300 019	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-56	
	GR-63-CORE Sec 4.1.2		
Salt Fog & Spray	ASTM B117		
Spatial*	GR-63-CORE Sec 2.0 & 3.0		
Spraying-Splashing	IEC 60529	IP-x3 & IP-x4	
Storage (Temperature & Humidity)*	ETS 300 019	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-30 IEC 60068-2-56	
	GR-63-CORE Sec 4.1.1		
Vibration	ETS 300 019	IEC 60068-2-6 IEC 60068-2-27 IEC 60068-2-29 IEC 60068-2-32 IEC 60068-2-57 IEC 60068-2-64	
	GR-63-CORE Sec 4.4	Earthquake, Office & Transportation	
Water Immersion	IEC 60529	IP-x7 & IP-x8	
Water Jet	IEC 60529	IP-x5 & IP-x6	
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